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In the year 1750 they had an earthquake here, which lasted for three months, with almost continual tremblings, which at last broke out in an eruption, in a small island in the middle of a large lake, all round which, the bottom is unfathomable. The third day after the commencing of the eruption, there arose four more small islands in the lake, all burning; and about a mile distance from one there is a continual fire, which comes out of the water, where there is no ground, for upwards of an hundred fathoms deep. This I saw myself, and went very near it. I will get a draught of it and send it you. This happened but four years ago, and if you were to feel some of these shocks, you would think they were capable of producing any thing, for they are very terrible indeed.

LXIV. *An Essay on the Waters of the Holy Well at Malvern, Worcestershire. By J. Wall, M. D. Communicated by the Rev. Charles Lyttleton, L. L. D. Dean of Exeter.*

Reverend Sir,

Read Feb. 5, 1756. **A**S you are pleased to desire some account of my observations on the Malvern-Waters, I have here transmitted them. That I did not do this sooner, you will, I hope, impute to the true cause, the multiplicity of my avocations. I would gladly have repeated the experiments,

ments, and added some more; but my want of leisure and the badness of the weather prevented me. I am very sensible of the imperfection of this essay, and that it does not deserve the attention of that learned body, to which you are desirous to communicate it; but as it may perhaps excite some more able hand to pursue the same subject, or induce some benevolent minds to make a well of such virtues more extensively useful, by adding some proper accommodations to it, I do not hesitate to offer it to you, crude as it is.

An Account of some Experiments made upon Malvern-Water, at the Spring-head, Sept. 15, 1743, being a warm, clear Day, in a dry Season.

1. At the spring-head it is extremely cold.
2. It leaves a peculiar pertness, or acrimony in the throat, after it is swallowed, when drank immediately from the spring; but grows remarkably softer upon keeping, more especially if the place be not very cool.
3. Upon pouring it, when fresh taken from the spring, into a large deep vessel, a great number of very small air-bubbles arose from the bottom, and continued to do so for a great while together.
4. Some powder'd loaf sugar being put into a glass of the water caused at first no alteration; but when the sugar began to dissolve, an extraordinary number of air-bubbles arose incessantly, and continued to do so for a very considerable time.
5. Being mixt with volatile spirit of sal ammoniac, it acquir'd a very dilute, bluish tincture, but remained equally transparent as at first, without the least

least milkiness. This blue tinct was so very dilute, that it was barely perceptible.

6. Oil of tartar per deliquium being dropt in it, no alteration in colour or transparency ensued; nor was there any precipitation, or ebullition.

7. Rhenish-wine and weak spirit of vitriol produced no ebullition or conflict.

8. With galls it grew turbid, but acquired no purplish cast.

9. Solution of silver being mixt with the water did not at first alter its colour or transparency, but by degrees the water grew a little milky; and, by standing some time, became muddy; and then of a dirty reddish purple, and at last, a powder of a deep purple colour was precipitated to the bottom of the glass.

10. A tincture of logwood, made in distilled water, was not alter'd in colour; only the tinct was diluted in proportion to the quantity of water mixt with it.

11. In like manner it alter'd not, but only diluted, the colour of syrup of violets.

12. It bears soap extremely well.

13. This water being carried to Worcester, which is about eight miles distant from the spring, in clean bottles close stoppt, was weighed very accurately in a large vessel with a very slender neck, by a nice balance, which would bear 14 lb in each scale, and yet turn with a single grain; when it was found, that this vessel filled with

Malvern-water weighed	3 51	3 2	3 2	gr. 6
Bristol-water	3 51	3 6		gr. 4
Rectified spirit of wine	3 41	3 6	3 2	gr. 6.

14. Three quarts, wine-measure, being slowly evaporated in a silver vessel, left not any fæces, or powder that could be collected, but only tinged the bottom of the vessel of a pale yellow colour, as if it had been slightly gilded.

15. Some of this water having been sent up to the very learned and ingenious Dr. Hales (whose genius for experiments of this kind, and veracity in relating them, are above all encomium) was by him examined. The following is an extract of his letter to the rev. Mr. Clare of Madresfield, on this subject.

Teddington, near Hampton-court, Oct, 25, 1750.

S I R,

“ I Have examined the Malvern-water by evapo-
 “ rating a pound averdupoize of it to a dryness,
 “ in a Florence flask, cut with a red hot iron ring to
 “ a mouth of about three inches diameter, as I have
 “ in the same manner examined many other purg-
 “ ing, steel, rain and common waters; and find, as
 “ you told me, that it is a very pure water, with less
 “ than a grain of sediment, ash-coloured, which does
 “ not liquefy by standing, as the sediment of most
 “ waters does: a sign, that it has no salt in it. But
 “ it was very observable, that when it was almost
 “ evaporated to a dryness, there arose invisible pun-
 “ gent vapours, which smelt much like the vapour
 “ of burning brimstone; which was observ’d, not
 “ only by myself, but by others, who came into my
 “ parlour. This pungency was very strong, when
 “ my nose was near the flask, which was set in a
 “ pipkin surrounded with sand. We may reasonably
 “ conclude,

“ conclude, that the sanative virtue of this water is
 “ in this subtle volatile sulphur.

It appears from these experiments, that this water is remarkably pure, light, free from earth and salts of any kind [5, 6, 7, 9, 10, 11, 13, 14.] That it contains some mineral spirit, or at least a volatile elastick fluid [2, 3, 4.] That there is some reason to suspect that it is slightly impregnated with copper [5]; a solution of which may probably be effected by the sulphureous gas observed by Dr. Hales [15]; and that it contains something bituminous [14].

So pure a water may naturally be supposed to keep well, and yet it is not always found to do so, being in some seasons apt to get sourish, and to be full of viscid films, even when all imaginable care has been taken in regard to the bottles, &c. so that there are certainly some substances concealed in the water, which our experiments have not as yet discovered.

This water has been long famed in the country for many extraordinary cures perform'd by it; but being situated in a place, where there is at present no accommodation for strangers, its use has not been so extensive as otherwise it might have been. I find it mentioned in Bannister's breviary of the eyes, printed A. D. 1622, in these lines.

A little more I'll of their curing tell,
 How they help sore eyes with a new found well.
 Great speech of Malvern-hills was late reported,
 Unto which spring people in troops resorted.

There are two springs, both of which rise very high up the hill, facing the East; the uppermost,
 O o o 2 which

which is about a hundred yards higher upon the hill, is chiefly applied to the eyes; and the other used internally, in several scorbutic and other disorders; or externally to tumors and fores. This distinction is taken notice of by almost every writer, who has treated on the geography or natural history of this county; and yet there does not, from any experiment, appear to be any real difference between them.

The springs are not encreased or diminished very sensibly, either by rains, or drought; and yet the water certainly receives some alteration from the variety of the weather; because it has been observed by those, who have washed their fores at the spring, that the water does not so well agree with them after heavy rains, or fierce showers, as in clear settled weather; which probably is owing to the admixture of some extraneous substance with the water. This also may be the reason, why, in some later experiments, the water has appeared to contain more earth than it did in those I formerly made, when the season was much drier than it has been for some years last past.

The water, upon its first use, purges most persons, and that pretty briskly, if the quantity they drink be considerable; some it vomits, but without much sickness; but it is diuretic in all. It has been long used, both externally and internally, with very great success, particularly in old foul ulcers, disorders of the eyes, scrophula's, leprosies and other diseases of the skin. Many wonderful cures I have been myself witness to in each of these cases.

Mr. G—— S——, a mercer of this town, when he was young, had a scrophulous ulcer in the elbow,
which

which had much enlarged the joint and fouled the bone. He had been long attended by two surgeons of eminence, who had at last proposed amputation, as the only probable means of cure. His parents not being willing to submit to this, sent him to Malvern, and by the use of this water, for a few months he was perfectly cured, and the limb has remained well ever since.

A poor woman near this city was covered with the most frightful leprosy I ever saw. The scabs were very numerous, large, and in many places more than a quarter of an inch thick. She had lost her eyebrows, and was so hoarse that she could hardly articulate. Many of the most efficacious medicines had been tried by me and others without success; at last she was sent to Malvern, and a little hut built for her near the well, by the charity of a neighbouring gentleman*. She used the water both externally and internally. In two or three months her skin was tolerably cleared, and she began to recover her voice; and by continuing the water, she was at length perfectly cured.

In the year 1754 I recommended these waters to a young woman, daughter to one Mr. Wilmot, a shoemaker in Bewdly. She had long had a scrophulous ulcer in each cheek, and an ophthalmia in each eye, which made her unable to bear the light, or to find her way about the house. She had continued in this condition nine or ten months, and tho' she had applied to several persons of skill, had not received much benefit from any medicines or applications

* Reginald Lygon, Esq;

When she was brought to the well, she was forced to be led by another person ; but she had not used the waters a week before she saw well enough to discover a flea leaping on her bed. Her sight is now perfect, and the ulcers are healed.

A child of one Mr. Morris, a grocer in this town, about three years of age, had the submaxillary glands very much enlarged ; he had a scrophulous ophthalmia in each eye, and his lips were very much swelled, the upper one in particular projected farther than the end of the nose, which it quite touched, and was excoriated with several very deep fissures in it. He used the waters two or three months, and returned home with his eyes quite well, the lips healed and reduced to their natural size, and the glands of the neck also very much lessened.

These are a few out of the very many instances of the efficacy of these waters, which I have seen myself, hundreds might be produced : if there were occasion.

Those, who use the waters externally, usually bathe in them with their linnen on, and dress upon it afterwards wet as it is. The sores, or tumors also, are covered with linnen, which is kept constantly wet with the water. During this course they ought to drink nothing but the water, and to take that in as large a quantity as they conveniently can. This method, odd as it is, has not hitherto been found to be attended with any inconvenience. Those, who use it thus externally, are apt to find themselves hotter than usual, with an increased thirst, as soon as their tumors or sores begin to grow better ; but for these complaints they have a remedy at hand, for
by

by drinking more freely they soon go off. These symptoms seem to arise from some matter being repelled and taken up into the circulation ; but as the water is so pure, it is soon washed off by it, and carried out of the habit.

Indeed the efficacy of these waters seems to be owing chiefly to their extreme purity and lightness, by which they are enabled to pervade the finest vessels, and not being loaded with any earths or salts, are capable of dissolving more than those waters which are already impregnated with them. And if we consider the ill effects, which waters full of stony or styptic particles have on the constitution, producing glandular obstructions and the like, we may in some measure conceive, how waters, which are pure and almost elementary, may assist in removing such diseases. But beside this extreme purity, the efficacy of this spring must be greatly assisted by the elastic fluid, which it appears to contain from Exp. 2, 3, 4, as well as by its bituminous or sulphureous parts, 9, 14, 15. It may also be expected to act still more powerfully (both externally and internally) if it be impregnated with any subtle tincture from copper ; as is probable, not only from Exp. 5, but from the effects sometimes observed upon its first use. Besides these qualities, I suppose part of its efficacy in external application may arise from its coldness.

But whether, by any chemical analysis we can discover its principal contents, or not, so long as it is found to produce such extraordinary effects, we may there rest satisfied ; experience being the best test of the nature of any spring. For however the
methods

methods of examining mineral waters may have been improved by the sagacity and industry of later chemists, it must be owned, that we are still far from perfection in that point ; and perhaps the most active parts of waters, on which their virtues chiefly depend, may lie so much out of our reach, as not to be the objects of sense, or discoverable by any experiments. Dr. Winter, in his *Cyclus Metasyncriticus*, has a very pertinent observation to this purpose, which I cannot forbear transcribing. “ It is “ not necessary, says he, that waters should contain so large a quantity of the particles they have “ imbibed, as may be evident to our senses : for we “ know by experiment, that *reg. antimon.* frequently macerated in wine, loses nothing of “ its weight or substance, tho’ the wine proves “ strongly emetic. p. 40.” And may not waters be impregnated somewhat in the same way by effluvia from mineral substances unknown to us, and therefore not discoverable by any experiments ?

Worcester,
Dec. 12, 1755.

J. Wall.